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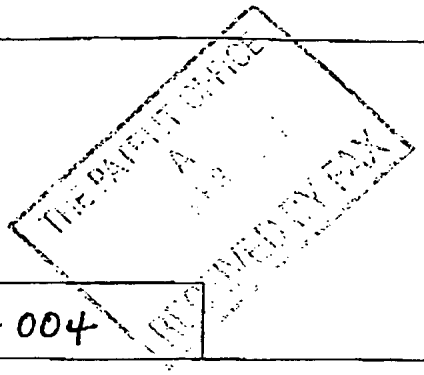

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Your reference 96-MRW-004

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Request for grant of a Patent

Form 1/77

Patents Act 1977

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1 Please give the title of the invention: A METHOD FOR REMOTELY CONTROLLING A PLURALITY OF APPARATUS USING A SINGLE REMOTE CONTROL DEVICE

❷ Applicant's details

☐ **First or only applicant**

2a If you are applying as a corporate body please give:

Corporate name: SGS-THOMSON MICROELECTRONICS LTD

Country *(and State of incorporation, if appropriate)*: United Kingdom

2b If you are applying as an individual or one of a partnership please give in full:

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Forenames

2c **In all cases**, please give the following details:

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Agent's address 54, Doughty Street,
London WC1N 2LS.

Postcode

Agent's ADP number

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3b: If you have appointed an agent, all correspondence concerning your application will be sent to the agent's United Kingdom address.

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ALMONDSBURY
BRISTOL

Postcode BS12 4SQ

Daytime telephone number *(if available)* 01454 611 599

ADP number *(if known)* GBSISSC1001

❹ Reference number

4 Agent's or applicant's reference number *(if applicable)* 96-MRW-004

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Claim(s)	4	Description	18
Abstract	1	Drawing(s)	2

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A METHOD FOR REMOTELY CONTROLLING A PLURALITY OF APPARATUS USING A SINGLE REMOTE CONTROL DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a method for remotely controlling apparatus.

More particularly, the present invention relates to a method for remotely controlling a plurality of apparatus using a single remote control device.

2. Background Art

In reletevly recent times, apparatus such as televisions sets (TV), video recorders (VCR), music centres (HiFi), satellite set top box receivers (STB), etc. have been supplied with their own individual remote control devices. The manufacteres of such apparatus use different, and quite often unique, sets of control signals or codes for controlling, via remote control devices, each of these apparatus. Therefore, someone who has, for example, a TV, VCR, HiFi and a STB would expect to have four remote control devices: i.e. one remote control device for each apparatus; especially if the apparatus originated from different manufacterers.

Apart from the practicle problems of managing, and often juggling, a plurality of remote control devices, an economic problem arises in that each remote control device comes with its own component and assembly cost: that is hidden within the cost of the apparatus; which is borne by the consumer. Additionally, each remote control has to be powered: again at a cost to the consumer; and typically this would mean having to have between four and eight batteries for four remote control devices. The ultimate disposal of these numbers of batteries, multiplied by a nation of consumers having a plurality of remote control devices, would impact upon the enviroment as time progresses.

There are some suppliers that offer, for example, a TV and VCR as a set, which has a single, combined, remote control device that can be used to operate both the TV and the VCR. However, relatively speaking it is not often that such TV/VCR sets are bought, as they tend to be aimed and the high end of the consumer/business market. Therefore, the majority of TV/VCR combinations tend to be incompatable in terms of being controlled via a single remote control device. Therefore, the impact of such TV/VCR sets does very little to alleviate the practicle, economic and enviromental problems mentioned above.

Attempts have been made in recent times to provide consumers with what are generally known as 'universal' remote control devices. The purpose of such a universal remote control device is to alleviate the aforementioned problems. However, there are also problems associated with these universal remote control devices. These problems can be summarised as follows.

For the universal remote control device to be truely universal, it must contain the control codes or signals that correspond to all apparatus available on the market. Apart from the practical and economic problems of a manufacterer of such universal remore control devices having to keep abreast of all emerging new codes, the universal remote control device would require a significant amount of memory to store the all the various codes. Such memory is relatively expensive especially if this memory comes as a standalone memory. Furthermore, once a universal remote control device is sold it would have to be updated if it is to be at all effective for the future. Such an updateable universal remote control device would require, relatively more expensive, programable memory in addition to circuitry for receiving and processing new data, relating to the new codes, and controlling a memory write operation.

It should be noted that the majority of present day remote control devices are optically based and operate in the infa-red band of the light spectrum. However, for the purposes of this document all previous and future reference to a remote control device is intended to include all types of current, and indeed future, remote control device such as acoustic and radio frequency (RF) remote control devices.

OBJECTS & SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to overcome the aforementioned problems and attributable drawbacks associated with the current state of the art.

Another object of the present invention is to provide a method for allowing a single apparatus, and its associated remote control device, to operatively control one or more other apparatus that are otherwise susceptible to being controlled by signals from their respective remote control devices.

Another object of the present invention is to provide a method for allowing a single apparatus, and its associated remote control device, to operatively control one or more other apparatus that are otherwise susceptible to being controlled by remote control signals.

Another object of the present invention is to provide a method for allowing a single apparatus, and its associated remote control device, to mimic or emulate the control signals of one or more other remote control devices so as to be able to operatively control the apparatus that would otherwise be controlled by the aforementioned other remote control devices.

Another object of the present invention is to provide a method for allowing practicle, economic and enviromental saving to be made by providing a method for allowing a single apparatus, and its associated remote control device, to operatively control one or more other apparatus that are otherwise susceptible to being controlled by signals from their respective remote control devices, i.e. providing a method for allowing a single apparatus, and its associated remote control device, to mimic or emulate the control signals of one or more other remote control devices so as to be able to operatively control the apparatus that would otherwise be

controlled by the aforementioned other remote control devices.

Another object of the present invention is to provide a method for allowing a first apparatus to receive, by interogation, then store remote control signals from one or more remote control devices, which are respectively associated with one or more second apparatus, in order that a single remote control device and its associated first apparatus can operatively control the one or more second apparatus.

Another object of the present invention is to provide a method for allowing a first apparatus to receive then store remote control signals corresponding to those of one or more remote control devices, which are respectively associated with one or more second apparatus, in order that a single remote control device and its associated first apparatus can operatively control the one or more second apparatus.

In order to achieve these objects, the present invention proposes a method of controlling a first apparatus 10, which is operatively responsive to first control signals CS1 from a first remote control device RC1, said method comprising the following steps: receiving said first control signals CS1; receiving first reference control signals CR1 from a storage medium MEM, such as a ROM, EPROM, EEPROM, said first reference control signals CR1 corresponding to said first control signals CS1; comparing said first control signals CS1 and said first reference control signals CR1; and operatively controlling, said first apparatus 10 in response to said first control signals CS1 when said first control signals

CS1 and said first reference control signals CR1 equal each other, characterised in that, said method further comprises the following steps, which allows said first remote control device RC1 and said first apparatus 10 to operatively control one or more second apparatus 20-40 that are otherwise operatively responsive to respective second control signals CS2-CS4 from respective one or more second remote control devices RC2-RC4: providing said first remote control device RC1 with additional operational functions, and corresponding third control signals CS1', that respectively correspond to operational functions of said one or more second apparatus 20-40, said additional operational functions and third control signals CS1' being either selectively and/or permanently available; receiving and storing in said first apparatus 10, as part of an initialisation procedure and either in response to a request and/or as part of a predetermined sequence, said second control signals CS2-CS4 that have corresponding third control signals CS1', said received second control signals CS2-CS4 being stored as second reference control signals CR2 in said storage medium MEM; receiving said third control signals CR1' from said first remote control device RC1; receiving second reference control signals CR2 from said storage medium MEM; comparing said third control signals CS1' and said second reference control signals CR2; and operatively controlling, by means of said second reference control signals CR2, said one or more second apparatus 20-30, via said first apparatus 10, when said third control signals CS1' and said second reference control signals CR2 equal each other.

According to other objects of the present invention, said first apparatus 10 is a satellite and/or cable set top box, STB, receiver or a video recorder, VCR, or television, TV, and said one or more second apparatus 20-40 could respectively include a video recorder and a television or a set top box receiver and a television or a set top box receiver and a video recorder.

According to another object of the present invention, said one or more second apparatus includes a sound system, HiFi, for example a combined radio, cassette player and CD player.

According to another object of the present invention, said one or more second apparatus includes home automation apparatus such as automatic blinds/shutters, light switching, security cameras etc.

According to another object of the present invention, said second control signals are received in response to a request from said first apparatus from said one or more second remote control devices.

According to another object of the present invention, said second control signals are received as part of a predetermined sequence from a portable storage medium.

According to another object of the present invention, said portable storage medium is a smartcard or some other 'chip-carrying' medium.

According to another object of the present invention, said second control signals are received as part of a predetermined sequence via said first apparatus's broadcast medium: the broadcast medium being for example the satellite dish receiver or a fibre optical cable and

their respective associated hardware and system technologies.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, as well as other advantages and features, of the present invention will become apparent in light of the following detailed description and accompanying drawings among which:

Figure 1 illustrates an embodiment of a typical system concept according to the present invention; and

Figure 2 illustrates an embodiment of a typical block diagram of circuitry within an apparatus according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The following figures which illustrate the various embodiments of the present invention may incorporate the same or similar elements. Therefore, where the same or similar elements occur throughout the various figures, they will be designated in the same manner.

Figure 1 illustrates an embodiment of a typical system concept according to the present invention.

This system embodiment is illustrated as comprising a number of different apparatus, which include: a satellite set top box receiver 10, i.e. a STB; a video recorder 20, i.e. a VCR; a television set 30; i.e. TV; and a sound system 40, i.e. HiFi.

The STB 10 is shown as receiving broadcast signals via a satellite dish 45. Alternatively, the broadcast signals

could be provided, via an optical cable, by a 'cable provider'.

The STB 10 has a common operative connection(s), which could be a coaxial or scart cable for example, into the VCR 20 and the TV 30. The video is illustrated as having an operative cable connection(s) into the TV 30. The HiFi is illustrated as having no physical connection to either the STB 10, VCR 20 or TV 30. The arrangement of this embodiment of a system and its associated connections is known to those skilled in the art.

It should be noted that this embodiment could also include other apparatus, either connected phyisically or non-physically, to the STB 10, such as home automation apparatus, for example automatic blinds, video security etc.

It can be seen from this embodiment that the STB 10 incorporates two blocks RX and TX and the overall system embodiment illustrates four remote control devices RC1-RC4: the latter three RC2-RC3 being represented by dashed-line rectangles. The block RX receives, as it would in the state of the art, control signals CS1 from RC1.

According to one embodiment of the present invention, the STB 10 is capable of receiving, i.e. downloading, via the block RX, and processing the respective control signals CS2-CS4 from the remote control devices RC2-RC4 that are respectively associated with the apparatus 20, 30 and 40.

According to another embodiment of the present invention, the STB 10 could receive, i.e. download, the control signals CS2-CS4 via a smart card, or another

suitable medium, that is input to the STB 10 and/or via the satellite dish 45 or fibre optic cable. Being able to download from a smartcard or from the broadcast signals, for example, has the advantage of not having to have the remote control devices RC2-RC4.

Also according to the present invention, the block TX transmits control signals CS5 that are used to control the other apparatus 20, 30 and 40. Alternatively, the STB could control the other physically connected apparatus 20 and 30 via the cable.

It should be noted that in this particular arrangement, the STB 10 is illustrated as controlling the other apparatus 20, 30 and 40. However, the arrangement could be adapted such that any one of the other apparatus, such as the VCR 20 or the TV 30 for example, is used to control the other apparatus.

Figure 2 illustrates an embodiment of a typical block diagram of circuitry incorporated within an apparatus according to the present invention.

This block diagram is illustated as comprising: a receiver RX; a microcontroller μC, a memory MEM; and a transmitter TX.

According to one embodiment of the present invention the STB 10 is capable of receiving, i.e. downloading, via the block RX, and processing the respective control signals CS2-CS4 from the remote control devices RC2-RC4.

In this particular embodiment, the user initiates a software program within the STB 10 that allows the remote control devices RC2-RC4 to be interogated. The results of the interogation, i.e. the remote control signals or codes CS2-CS4 associated with the other apparatus are

stored in a memory device: for example ROM, EPROM, EEPROM etc.; preferably within the STB 10. The remote control codes CS2-CS4 received from the remote control devices RC2-RC4 are operatively stored such that they correspond to known, or defined, respectively different remote control codes that are associated with the remote control device RC1. An important point to note is that the remote control signals CS1 of RC1 that correspond the respective remote control signals CS2-CS4 from RC2-RC4 have to have the same associated functions: therefore when the 'rec' button on RC1 is pressed, the VCR 20 records, bur doesn't eject a tape for example.

The software program for carrying out the interogation could be initiated either from the remote control device RC1 or by pressing a button(s) on the STB 10.

In this embodiment, the microcontroller μC of the STB 10 outwardly interfaces with the user, via the coax/scart connection(s), using the TV 30 for example.

The first issue to be addressed by the software program is, to what type of apparatus do the remote control codes CS2-CS4, that wish to be stored and cross referenced, correspond. The program could give the user a choice of options from a predetermined list. Alternatively, the user could interface with the STB 10 so as to enter a non-specified apparatus, and even non-specified functions, using the keypad of the remote control device RC1, such interface techniques are known to those skilled in the art.

It should be noted that the remote control device RC1 would require a keypad arrangement and control sequence that allowed it to work in various modes. For example, in

a first, STB, mode M1, only those buttons, or button sequences, relating to the STB 10 functions would output corresponding remote control signals or codes for operating the STB 10. In a second, VCR, mode M2, only those buttons, or button sequences, relating to the VCR 20 functions would output corresponding remote control signals for operating the VCR 20, and so on. These various modes M1, M2, ... Mn etc, could be selected by pressing an appropriate button, or sequence of buttons, on RC1. In this example of distinct modes M1, M2, ... Mn etc, either the remote control device could add some distinguishing element to each transmitted remote control signal(s) or alternatively, RC1 could send a signal(s) to the STB 10 that sets up the STB 10 for the corresponding required mode.

Alternatively, there could be mixed-mode functioning. Mixed-mode functioning would be possible when in one mode, a function that was unique to another mode, i.e. another apparatus, was selected. For example, when in mode M1, a button on RC1 is pressed that corresponded to the VCR 'record' function. Since this 'record' function is unique to the VCR 20 then the need to enter into mode M2 is no longer necessary. In mixed-mode functioning, the need to enter into a particular mode would only be necessary when there is a button(s), or sequence of buttons, that are common to two or more apparatus, examples being numbers 0, 1, 2 ... n, volume +/-, channel +/- etc. It should also be noted that the remote control signals relating to the STB 10 apparatus will already be stored as reference remote control signals in the memory MEM associated with the microcontroller μC.

If, in this particular embodiment, the user selected an apparatus, for example a VCR 20, from a predetermined list of apparatus held within the memory MEM of the STB 10, then the STB 10 enters a routine. This routine requests, from another predetermined list, the user to press a sequence of buttons on RC2 etc. that corresponds to each of the various requests, i.e. the various functions associated with the VCR 20 etc. and each of the various request would have a corresponding reference remote control signal that is associated with RC1. There could also be the option of the user defining functions that the STB 10 does not recognise and the user and/or microcontroller μC assigning a corresponding RC1 reference remote control signal.

In an example of setting up a VCR 20, the remote control signals CS2 transmitted by the VCR 20 remote control device RC2 are received by the receiver RX, passed onto the microcontroller μC and then operatively stored in a memory location as a VCR reference remote control signals or codes along with associated RC1 reference remote control signals. For example, assume that the remote control signal from RC2 relating to the VCR's 'record' function was the four bit binary number 0110 and the corresponding remote control signal from RC1 relating to a VCR's 'record' function was the four bit binary number 1001: it should be noted that the codes from RC1 would have to be different from any of the codes associated with the other apparatus in order to avoid 'operational interference'. The binary number 1001 would be already be stored in memory, assuming it is predefined, and would be associated with the memory

location of the binary number 0110 of the corresponding function, which would be stored in a different memory location: therefore, the binary number 1001 would have a 'memory map' reference to the binary number 0110.

Having set up the memory MEM with the various reference remote control signals associated with the other apparatus and cross referencing them to corresponding RC1 reference control signals, during normal operation, everytime a remote control signal is received by the microcontroller μC, via the receiver RX, from RC1, the microcontroller μC compaires this received remote control signal CS1 with the RC1 reference remote control signals stored in the memory MEM. It should be noted that the process by which the microcontroller μC, and its associated search engine, compaires the received remote control signals CS1 and the RC1 reference remote control signals should be constructed so that it is the most efficient in terms of the time it takes to make the comparisons. The microcontroller μC should therefore be controlled so as to arrange the storing and retreval of the RC1 reference control signals relative, in the first instance, to the current mode to which either the STB 10 or the remote control device RC1 is set. Therefore, if the STB 10 or the remote control device RC1 is set to mode 1, i.e. STB mode, then the microcontroller μC and its associated search engine should only retreive and compare, in the first instance, those RC1 reference remote control signals that relate to the STB 10. The RC1 reference remote control signals could be retreived, for a particular mode, on the basis of the most frequently used remote control signals being retreived first and the

less frequently used remote control signals being retreived last. The microcontroller μC could be set up to learn, as time goes on, what RC1 remote control signals are used the most often and weight these RC1 remote control signals accordingly.

When the microcontroller μC finds a remote control signal from RC1 that corresponds to a RC1 reference remote control signal it must firstly determine if the received signals or codes are associated with the STB 10 or with other apparatus. If the RC1 received remote control signals are associated with the STB 10 then the STB 10 is operated in accordance with the received signals or codes. If the RC1 received remote control signals are not associated with the STB 10 then the STB 10 has to retrieve, from memory MEM, the remote control signals or codes to which the RC1 reference, and received, signals or codes correspond to. The microcontroller μC then outputs, via the transmitter TX, the non-RC1 reference remote control signals or codes that correspond to the received and stored RC1 remote control signals or codes, which operatively controls the corresponding apparatus.

The receiver RX would typically be a light sensitive semiconductor device that is capable of receiving signals, CS1-CS4, in the infa-red part of the light spectrum since, most remotely controlled apparatus uses the infa-red receivers and transmitters. Alternatively, a receiver that was capable of receiving electrical or electro-magnetic signals or codes could be employed. Another example of a receiver RX would be a modem that is

capable of receiving signals that superimposed upon the mains electricity supply of a household.

Likewise, the transmitter TX would typically be a light emitting semiconductor device that is capable of transmitting signals, CS5, in the infa-red part of the light spectrum. Alternatively, a transmitter that was capable of transmitting electrical or electro-magnetic signals or codes could be employed. Another example of a transmitter TX would be a modem that is capable of transmitting signals that superimposed upon the mains electricity supply of a household.

It should be noted that there could also be a plurality of different types of receivers and transmitters within an apparatus.

In a prefered embodiment of the current invention, the remote control signals corresponding to a particular apparatus could be input, or downloaded, via a smart card or via the broadcast medium, neither of which are illustrated.

The advantages of such an embodiment means that there is no longer a requirement for more than one remote control device. Therefore, all the disadvantages, such as cost and battery disposal, that is associated with a plurality of remote control devices would be eliviated. However, the former embodiment would serve well in the transitional period to this prefered embodiment.

In the case of the smartcard, the manufacturers of an apparatus would supply, with the apparatus, a smartcard that contained all of the remote control codes that are associated with the particular apparatus, or even a manufacterurs range of apparatus. The advantages of

smartcards are known and include portability, programming flexability, recyclability and low cost.

The 'master' apparatus: which in the example given above was the STB10, but alternatively could be any of the other apparatus 20, 30 or 40; would incorporate a smartcard reader and software that was operatively capable of extracting, from the smartcard, storing and cross referencing the remote control signals or codes associated with the 'slave' apparatus, for example a VCR 20.

In the case of the broadcast medium, the remote control signals associated with various apparatus could be transmitted, in the same or a similar manner as teletext, or even on a dedicated channel. The user could then, for example, select from a predefined list the type of 'slave' apparatus that is required to be controlled and then the 'master' device could automatically and opertively download, store and cross reference the remote control signals or codes associated with the particular 'slave' apparatus.

It should be noted that the arrangement, control and design of the various apparatus and the remote control device, and their interaction, embraces many fields, principles and techniques that are far to numerous and diverse to cover in any great detail in this document. For example: a system or protocol would have to be set up such that the remote control signals were all read or downloaded, stored and cross referenced in a predetermined manner such that they had a corresponding, known, references as to what their associated function and apparatus is; a protocol for selecting the 'master'

and 'slave' devices would need to be established, since the inventor envisages that there will be at least some key apparatus, such as STB 10, VCR 20 and TV 30 that will all have the possibility of being 'master' apparatus; the design, layout and control of the remote control device would have to take in a number of factors such as ease of use, the ability to control a plurality of apparatus, the possibility of defining what 'custom' apparatus and functions can be added etc.

Such fields, principles and techniques and requirements to expolit the present invention will be apparent to those skilled in the art in light of this disclosure embodying the present invention.

Although this invention has been described in connection with certain preferred embodiments, and generalised, it should be understood that the present disclosure is to be considered as an exemplification of the principles of the invention and that there is no intention of limiting the invention to the disclosed embodiments. On the contrary, it is intended that all alternatives, modifications and equivalent arrangements as may be included within the spirit and scope of the appended claims be covered as part of this invention.

Claims

1. A method of controlling a first apparatus, which is operatively responsive to first control signals from a first remote control device, said method comprising the following steps:

- receiving said first control signals;
- receiving first reference control signals from a storage medium, said first reference control signals corresponding to said first control signals;
- comparing said first control signals and said first reference control signals; and
- operatively controlling said first apparatus in response to said first control signals when said first control signals and said first reference control signals equal each other;

characterised in that,

said method further comprises the following steps, which allows said first remote control device and said first apparatus to operatively control one or more second apparatus that are otherwise operatively responsive to respective second control signals from respective one or more second remote control devices:

- providing said first remote control device with additional operational functions, and corresponding third control signals, that respectively correspond to operational functions of said one or more second apparatus, said additional operational functions and third control signals being either selectively and/or permanently available;

- receiving and storing in said first apparatus, as part of an initialisation procedure and either in response to a request and/or as part of a predetermined sequence, said second control signals that have corresponding third control signals, said received second control signals being stored as second reference control signals in said storage medium;

- receiving said third control signals from said first remote control device;

- receiving second reference control signals from said storage medium;

- comparing said third control signals and said second reference control signals; and

- operatively controlling, by means of said second reference control signals, said one or more second apparatus, via said first apparatus, when said third control signals and said second reference control signals equal each other.

2. A method according to claim 1, characterised in that said first apparatus is a set top box receiver.

3. A method according to claim 2, characterised in that said one or more second apparatus include a video recorder and a television.

4. A method according to claim 1, characterised in that said first apparatus is a video recorder.

5. A method according to claim 4, characterised in that said one or more second apparatus include a set top box receiver and a television.

6. A method according to claim 1, characterised in that said first apparatus is a television.

7. A method according to claim 6, characterised in that said one or more second apparatus include a set top box receiver and a video recorder.

8. A method according to any of the claims 3, 5 or 7, characterised in that said one or more second apparatus include a sound system.

9. A method according to any of the claims 3, 5 or 7, characterised in that said one or more second apparatus include home automation apparatus.

10. A method according to any of the claims 1-9, characterised in that said second control signals are received in response to a request from said first apparatus from said one or more second remote control devices.

11. A method according to any of the claims 1-9, characterised in that said second control signals are received as part of a predetermined sequence from a portable storage medium.

12. A method according to claim 11, characterised in that said portable storage medium is a smartcard.

13. A method according to any of the claims 1-9, characterised in that said second control signals are received as part of a predetermined sequence via said first apparatus's broadcast medium.

ABSTRACT

A METHOD FOR REMOTELY CONTROLLING A PLURALITY OF APPARATUS USING A SINGLE REMOTE CONTROL DEVICE

The present invention relates to a method of controlling one or more second apparatus from a first apparatus, which is responsive to first control signals from a first remote control device. The characteristic steps of the method comprising: providing the first remote control with additional operational functions, and corresponding third control signals, that correspond to functions of said second apparatus; receiving and storing in said first apparatus, as part of an initialisation procedure second control signals that have corresponding third control signals, said second control signals being stored as second reference control signals in a storage medium; receiving said third control signals from said first remote control; receiving said second reference control signals from said storage medium; comparing said third control signals and said second reference control signals; and controlling, by means of said second reference control signals, said second apparatus, via said first apparatus, when said third control signals and said second reference control signals equal each other.

Figure 1.

Figure 1

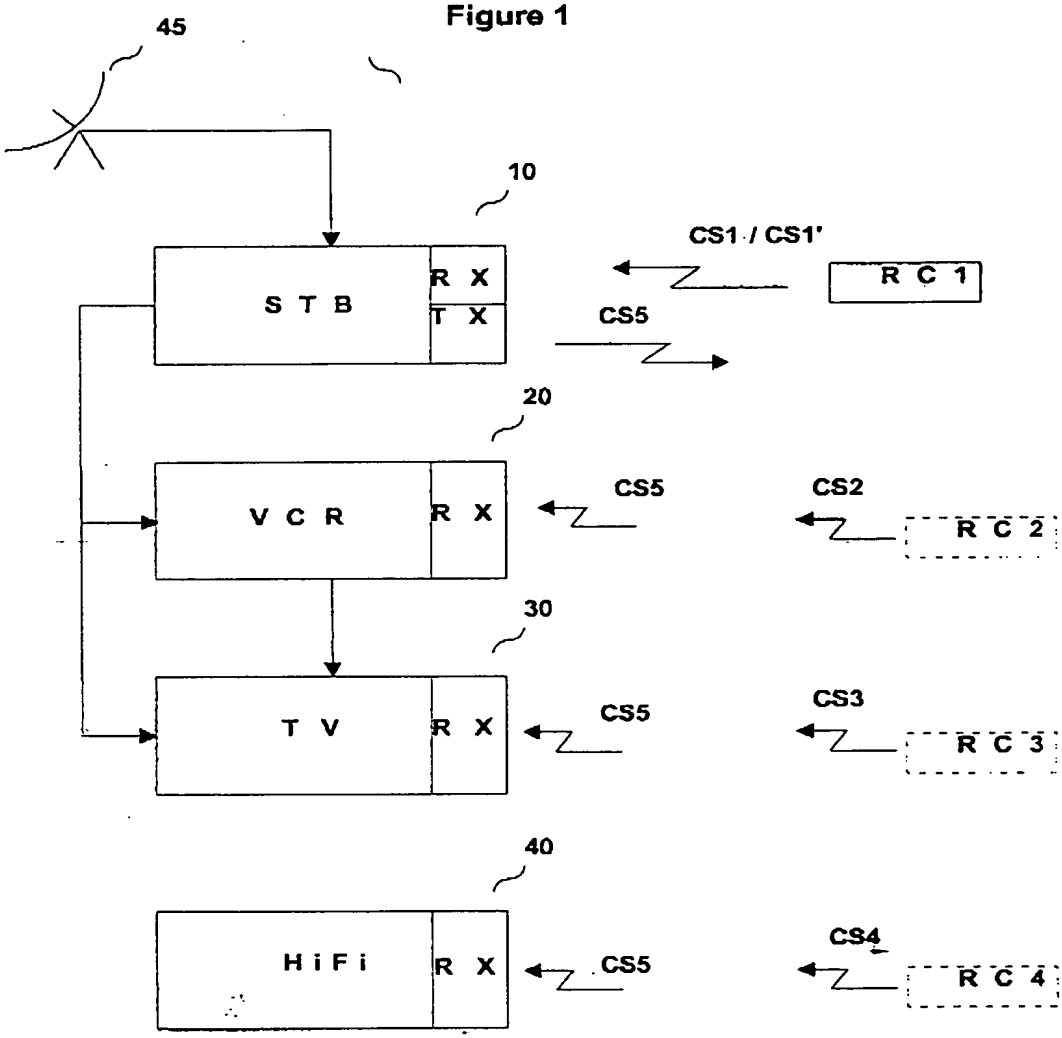
45
10
S T B
R X
T X
CS1 / CS1'
R C 1
CS5
20
V C R
R X
CS5
CS2
R C 2
30
T V
R X
CS5
CS3
R C 3
40
HiFi
R X
CS5
CS4
R C 4

Figure 2